



NAC Human Exploration and Operations Committee

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SPACEX



SpaceX Overview

- SpaceX designs, manufactures and launches advanced rockets and spacecraft
- Founded in 2002 to revolutionize space technology, with the ultimate goal of enabling people to live on other planets
- World's fastest growing launch provider
- Over 60 missions on manifest representing more than \$8 billion in contracts
- More than 4,000 employees and growing
- Honored to partner with NASA to return American crew carrying capability



SpaceX Vehicles

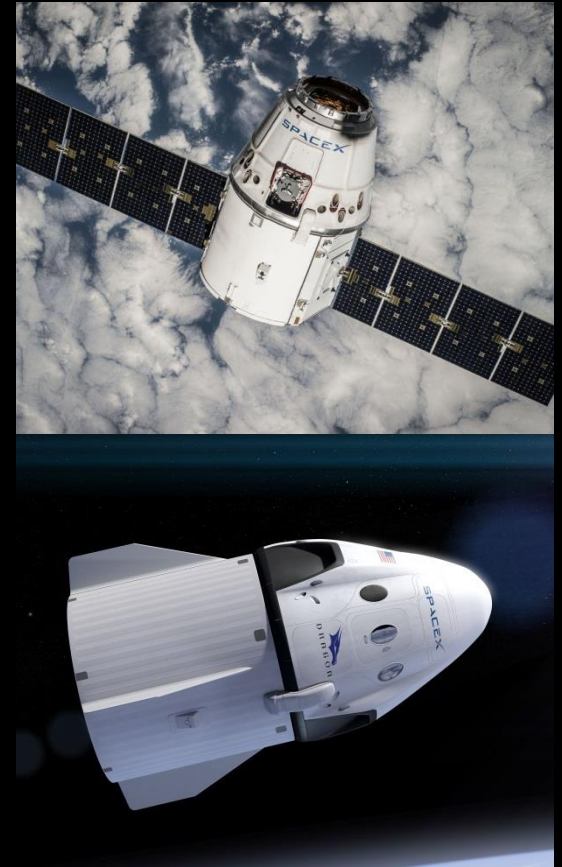
Falcon 9



Falcon Heavy

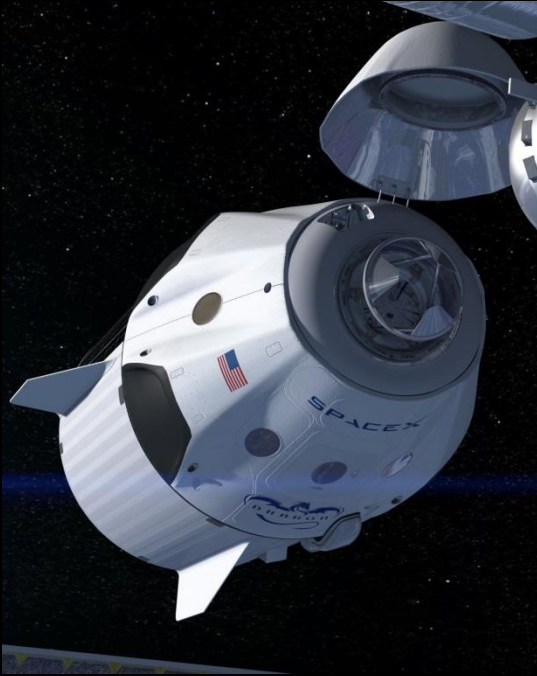


Dragon



Ongoing and Future Developments

Commercial Crew



Reusability

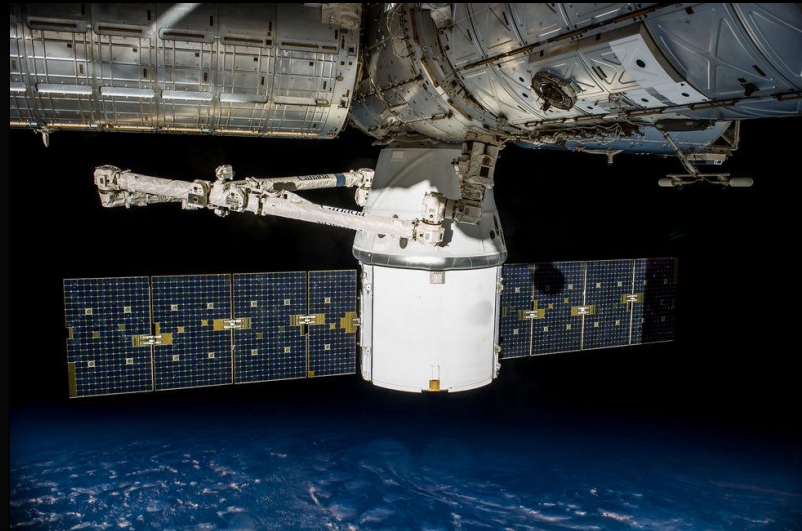


Mars



Partnership with NASA

SpaceX and NASA have developed a strong partnership through the Commercial Crew & Cargo programs



Commercial Crew Overview

- SpaceX is developing a safe, reliable and complete Crew Transportation System:
 - Crew Dragon vehicle
 - Falcon 9 launch vehicle
 - Ground launch system
 - All Operations: Crew, Launch, Mission, Ground, and Recovery
- Flights:
 - Demo-1 to ISS without crew
 - In-Flight Abort Test
 - Demo-2 to ISS with crew
 - Up to 6 Post Certification Missions (PCMs)



Crew System Architecture

- Spacecraft Segment (Dragon)
 - Crew Module, Service Section and Trunk
 - Launch Abort System (internally integrated into Dragon)
- Launch Segment (F9)
 - Merlin engines
 - LOX & RP-1 propellants
 - Landing legs (stowed in ascent)
- Ground and Operation Segment
 - Ground Systems
 - Launch Pad (LC-39A), Launch Pad facility, Ground software, ground communications & Launch Control Center
 - Operations System
 - Mission Control Center, Crew Operations, Training & Simulations, & Recovery



Crew Dragon Vehicle



Falcon 9



Mission Control in Hawthorne, CA



Launch Control Cape Canaveral, FL

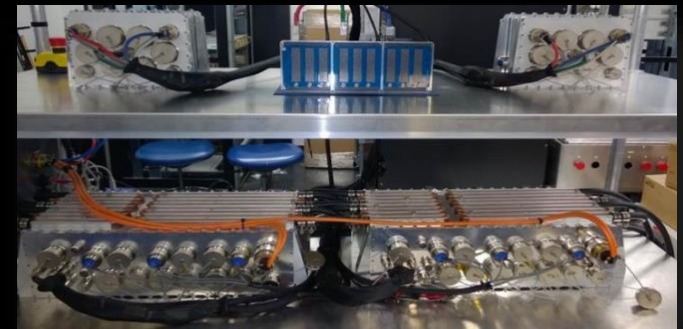
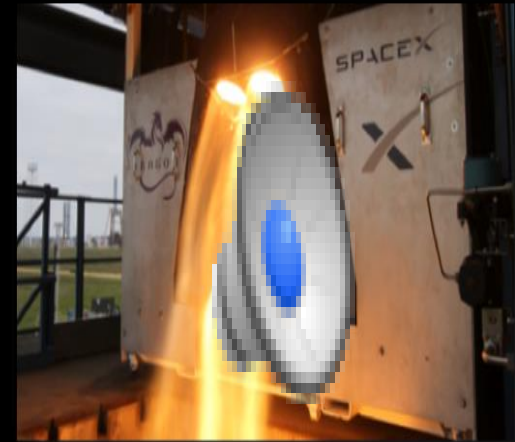


LC-39 Cape Canaveral, FL

Crew Interior

Program Milestones & Certification

- Recent completions:
 - **Certification Baseline Review (Dec 2014)**
 - **Pad Abort Test (May 2015)**
 - **Avionics Test Bed Activation (June 2015)**
- Major upcoming milestones
 - Initial Propulsion Module Testing
 - Docking system qualification
 - Critical Design Review
 - Launch Site Operational Readiness (LSORR)
 - Propulsive Descent Testing
 - Post-Certification Mission 1 Initiation Review
 - Delta Critical Design Review
 - Structural Qual Hatch Open Test
 - LSORR for Crew
 - Environmental Control and Life Support System (ECLSS) Integrated Test
 - Validation Propulsion Module Testing
 - Space Suit Qualification
 - **Demo 1 autonomous flight to ISS**
 - Parachute Qualification Complete
 - **In-Flight Abort Test**
 - Design Certification Review (DCR)
 - Flight Test Readiness Review (FTRR)
 - **Demo 2 crewed flight to ISS**
 - Operations Readiness Review (ORR)
 - Certification Review (CR)



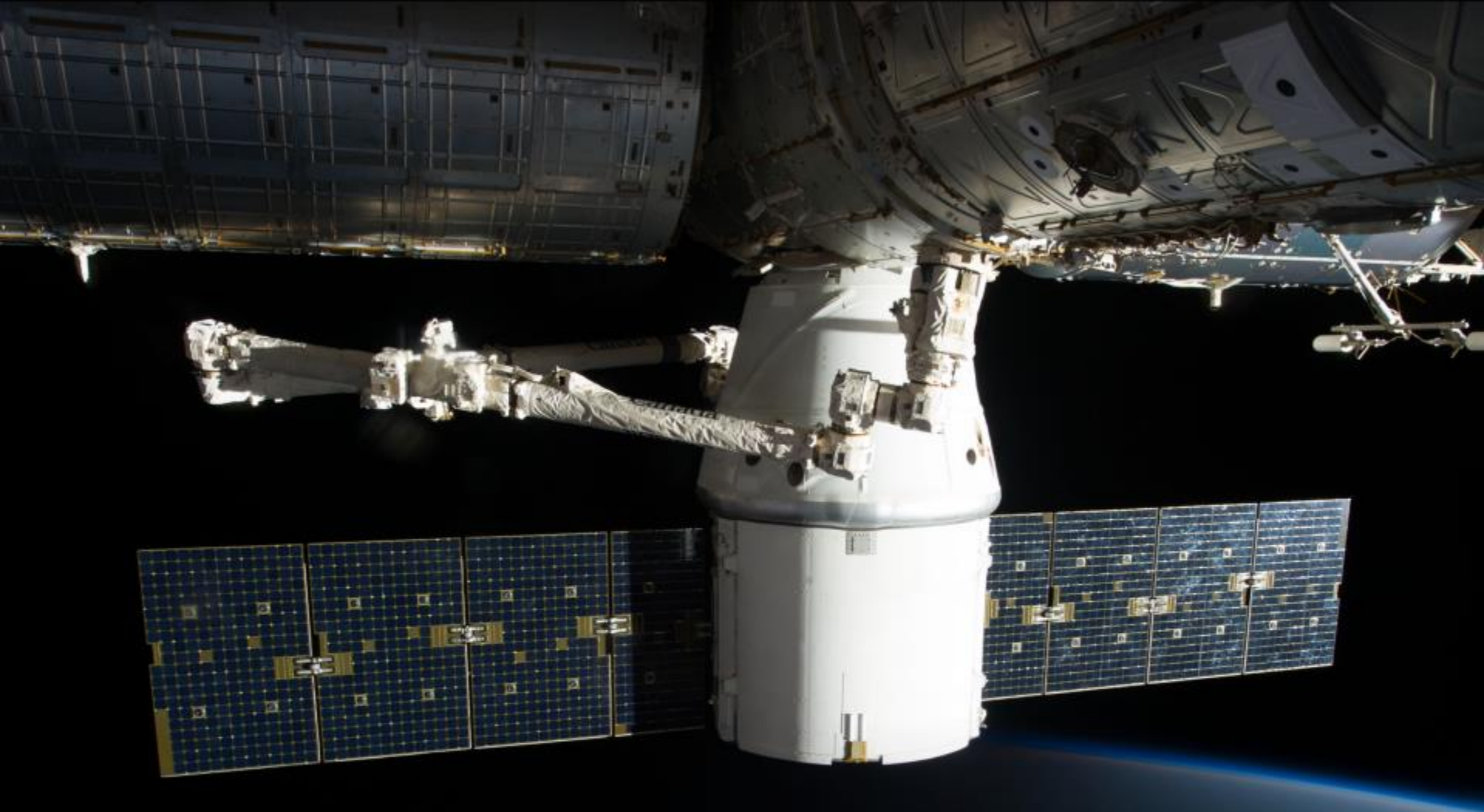
Pad Abort Test Success – May 2015

- First major flight test for Commercial Crew Program
- Validated key predictions for ensuring safe transport of astronauts to ISS
- Demonstrated significant progress toward returning safe and reliable domestic launch capabilities to the United States



Pad Abort Test





Questions?